The claims defining the invention are as follows:

1. A bell having the first at least three frequencies substantially in an harmonic sequence.

2. A bell having the first at least three frequencies substantially in an harmonic sequence wherein all the tuned frequencies are due to modes with no ring nodes.

3. A bell having the first at least three frequencies substantially in an harmonic sequence wherein, of the tuned frequencies, the frequencies due to modes with no ring nodes are all below any frequencies due to modes with ring nodes.

4. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the outer surface of the side portion being generally in the form of a truncated circular cone.

5. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the inner surface of the side portion being generally in the form of a truncated circular cone.

6. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the outer surface of the side portion being generally convex.

7. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the inner surface of the side portion being generally concave.

8. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the outer surface of the side portion substantially consisting of a generally convex portion and a portion generally in the form of a circular cylinder.

9. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the inner surface of the side portion substantially consisting of a generally concave portion and a portion generally in the form of a circular cylinder.

10. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the outer surface of the side portion substantially consisting of a generally convex portion and a portion generally in the form of a truncated circular cone.
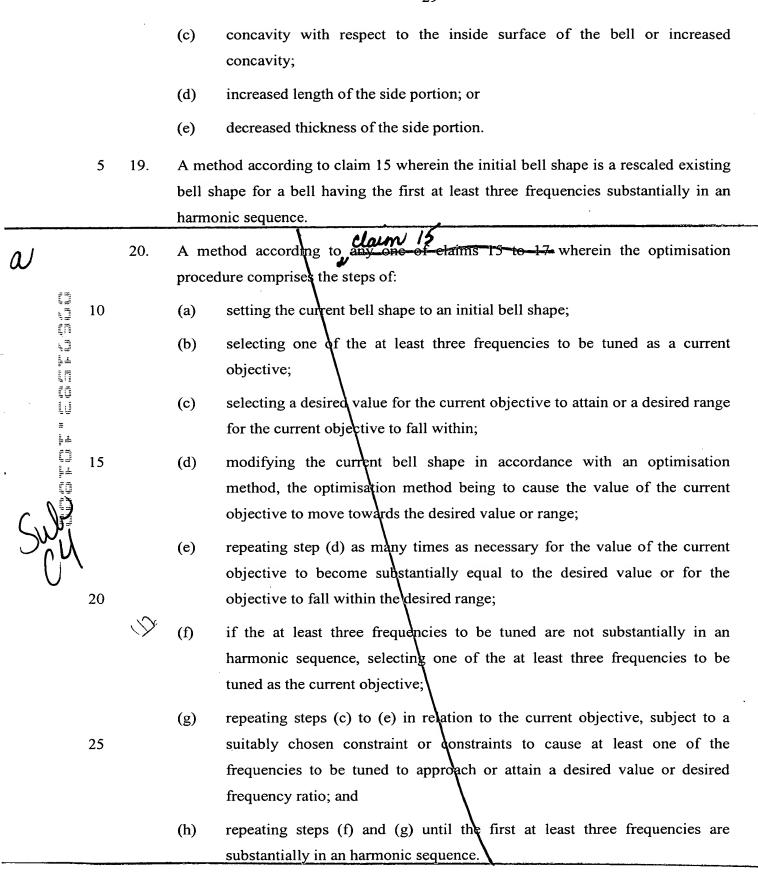
5 11. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the bell has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the inner surface of the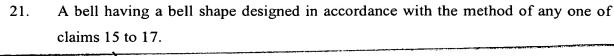 side portion substantially consisting of a generally concave portion and a portion generally in the form of a truncated circular cone.

12. A bell according to claim 1 ~~any one of claims 1 to 3~~ wherein the side portion is generally
10 tapered.

13. A bell having the first at least four frequencies substantially in an harmonic sequence.

14. A bell having the first at least five frequencies substantially in an harmonic sequence.

15 15. A method for designing a bell shape for a bell having the first at least three frequencies substantially in an harmonic sequence, the method comprising the steps of selecting an initial bell shape and using the initial bell shape in an optimisation procedure for modifying the bell shape such that the first at least three frequencies are substantially in an harmonic sequence.

20 16. A method according to claim 15 wherein the initial bell shape is such that, of the frequencies to be tuned, all the frequencies due to modes without ring nodes are below any frequencies due to modes with ring nodes.

17. A method according to claim 15 wherein the initial bell shape is such that the first at least three frequencies are due to modes with no ring nodes.

25 18. A method according to claim 16 ~~or claim 17~~ wherein the initial bell shape has a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, the initial bell shape being selected by introducing one or more of the following shape features to a first bell shape:

(a)   conicity or increased conicity;

30   (b)   tapering of the side portion or increased tapering;

(c)   concavity with respect to the inside surface of the bell or increased concavity;

(d)   increased length of the side portion; or

(e)   decreased thickness of the side portion.

5   19.   A method according to claim 15 wherein the initial bell shape is a rescaled existing bell shape for a bell having the first at least three frequencies substantially in an harmonic sequence.

20.   A method according to ~~any one of claims 15 to 17~~ claim 15 wherein the optimisation procedure comprises the steps of:

10   (a)   setting the current bell shape to an initial bell shape;

(b)   selecting one of the at least three frequencies to be tuned as a current objective;

(c)   selecting a desired value for the current objective to attain or a desired range for the current objective to fall within;

15   (d)   modifying the current bell shape in accordance with an optimisation method, the optimisation method being to cause the value of the current objective to move towards the desired value or range;

(e)   repeating step (d) as many times as necessary for the value of the current objective to become substantially equal to the desired value or for the objective to fall within the desired range;

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(f)   if the at least three frequencies to be tuned are not substantially in an harmonic sequence, selecting one of the at least three frequencies to be tuned as the current objective;

(g)   repeating steps (c) to (e) in relation to the current objective, subject to a suitably chosen constraint or constraints to cause at least one of the frequencies to be tuned to approach or attain a desired value or desired frequency ratio; and

25

(h)   repeating steps (f) and (g) until the first at least three frequencies are substantially in an harmonic sequence.

21.   A bell having a bell shape designed in accordance with the method of any one of claims 15 to 17.

22.   An axisymmetric bell having a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, a meridonal cross-section of the side portion being substantially geometrically similar to a cross-section having:

    (a)   an outer line formed by fitting an arc of a circle to the three points the rectangular coordinates of which are set out in table 3; and

    (b)   an inner line formed by fitting a line to the points the rectangular coordinates of which are set out in table 2.

23.   An axisymmetric bell having a top portion, a side portion and a mouth, the side portion extending from the top portion to the mouth, a meridonal cross-section of the side portion being substantially geometrically similar to a cross-section having:

    (a)   an outer line formed by joining a straight line to the two points the rectangular coordinates of which are set out in table 6; and

    (b)   an inner line formed by fitting a line to the points the rectangular coordinates of which are set out in table 5.